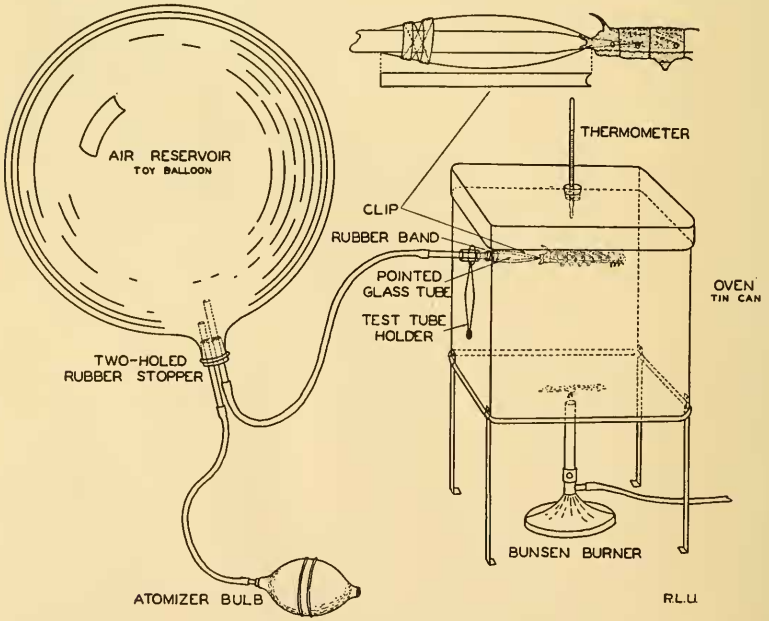
METHODS AND TECHNIQUE.

A Simple Device and Method for Blowing Insect Larvae. —The problem of adequate preservation of material has always been a serious one to entomologists who must collect perhaps a greater variety of forms than workers in any other single field. Amateurs, experimental workers under field conditions, and instructors who must carry on where the advantages of a large, well-equipped laboratory are not available must all make the most of what material they have at hand. While engaged in field collecting of red-humped, tomato worm, and other caterpillars the authors evolved the following modification of the usual method of larval blowing. The merit of this method lies not in originality of principle, for entomologists have inflated larvae with air and dried them in this condition for many years. Nor is there anything original in the idea of filling such specimens with some material in order to make them more solid and permanent. The purpose of the authors has been to accomplish certain desired results, namely, reasonably permanent preservation of soft-bodied caterpillars, etc., in a condition as nearly approaching their natural appearance as possible,



A SIMPLE DEVICE FOR BLOWING INSECT LARVAE

using only material which was on hand at the time and which would be available to a worker under practically any conditions (see figure 1).

A two-holed rubber stopper, through which two short pieces of glass tubing have been forced, is put in the mouth of a toy balloon. To one of these pieces of glass tubing is attached a rubber tube leading to an atomizer bulb which has a check valve at each end. To the other is attached a rubber tube leading to the oven. A piece of glass tubing is heated over a flame, drawn out to a fine capillary, and then broken at this point. Inserting this latter piece at the end of the rubber tube and fastening two clips (two pieces broken from a clock spring or two paper clips will do nicely) to the tip by means of a rubber band completes the essential part of the apparatus. The clips will hold the larva much more securely if their tips are notched with a rat-tail file (see inset). A caterpillar may now be prepared by inserting a dissecting needle in the anus to break the membrane and then rolling from head to anus using a pencil or some other round object. When the body contents have been entirely evacuated the skin may be fastened to the small apex of the glass tube by means of the aforementioned clips. Air is pumped into the reservoir (balloon) with the atomizer bulb and a continuous source of air is thus established which will keep the larva inflated for ten minutes or more.

For the "baking," heat from electric light bulbs was first used, the tube with its fully extended and inflated larva being held near a lamp. This necessitated frequent turnings to insure uniform drying on all sides and often resulted in burning of the specimen. Finally a tin can was substituted, being used as an oven, with one or more holes cut in its side to admit the specimens and a test tube holder soldered below each hole to hold the glass tube. Any heating element, bunsen burner, gas stove, etc., is satisfactory. A thermometer inserted through a hole in the top of the can aids in maintaining an even temperature (about 70° F. is best for most larvae).

After inflation and drying it was found that the dry, brittle skin of the caterpillars was not only very fragile but, in many cases, not even the same color as in nature due to the absence of the coloring matter of the body fluid. Both of these conditions may be overcome by melting paraffine (paraffine with a high melting point will be found most satisfactory) and adding pieces of children's Crayola of various colors until a shade is obtained which is similar to that of the body contents. A medicine dropper is heated, the above mixture drawn up, and then injected into the open anus of the larva.

If any paraffine remains visible at the anus after the whole body cavity has been filled it will soon be drawn in due to the shrinking of the paraffine and will leave no trace of the inner filling.

Specimens preserved in this manner have remained unchanged, even with rather rough treatment, for two years and appear to be satisfactory in every way.—A. S. Harrison and R. L. Usinger, Berkeley, California.

A NOTE ON HIBERNATING QUEENS OF THE WASP, VESPA MACULATA.

Phil Rau, Kirkwood, Mo.

I failed on many occasions successfully to carry through the winter the queens of the bald-faced hornet, even though I placed them in cages out of doors during the winter. Finding twelve queens hibernating in three fallen logs at Rankin, Missouri, on November 9 and December 5, 1931, gave me first-hand information of the conditions under which they naturally hibernate.

The queens had dug pockets for themselves in the moist and rotten logs in which to spend the winter. All three trunks were near a creek bed, on a very shady slope, and even though the days were comfortably warm when examination was made, the soft, rotten pulp in the interior of the log was moist and cold. This then is the method of successful hibernation; the selection of a "hibernacle" that is sufficiently moist and located so that it is not easily influenced by the rising temperature of an occasional warm day in the midst of winter. The positions of the logs on the slope were such that intermittent warm days would not affect the temperature of the interior of the log, and thereby not arouse the queens to premature activity.

The queens were not hibernating in ready-made galleries, but had actually made their own; in one case a pile of freshly bitten chips on the ground under the pocket was evidence that she had done her own work. In most cases one queen was in each pocket, but in two instances I found two queens in each pocket. Queens of *Polistes* wasps, and also of Bumble-bees select the same locality or are attracted to the same spot by the presence of the other queens of their respective species; in one of the above logs in an area of six square inches, I found six queens of *V. maculata* hibernating independently in as many pockets.

The secret, in all probability, for the successful hibernation of *maculata* queens seems to be cold and very moist conditions; with